

## **Building Permit Guides**

The City of Louisville Design Criteria, Prescriptive Energy Code, and items listed below shall take precedence over requirements listed in the Building Guides of the Colorado Chapter of International Code Council.

- The City of Louisville has adopted the 2018 International Code series.
- Please reference the city's design criteria and prescriptive energy code available on the City of Louisville website located at [www.louisvilleco.gov/government/departments/planning-building-safety/building-permit-guides](http://www.louisvilleco.gov/government/departments/planning-building-safety/building-permit-guides) .
- All decks are required to be designed by a structural engineer and shall include and engineer stamp and signature.

Sec. 15.05.130. - Section R507.1 amended—Decks.

[https://library.municode.com/co/louisville/codes/code\\_of\\_ordinances](https://library.municode.com/co/louisville/codes/code_of_ordinances)

Section R507.1 of the 2018 International Residential Code is amended to read as follows:

***R507.1 Decks.*** *Wood-framed decks shall comply with the standards set forth in this section. For decks using materials and conditions not prescribed in this section, refer to Section R301. All decks that are structurally supported from an existing residential home shall be engineered by a structural engineer that is licensed with the State of Colorado.*

- Flat roof and patio covers may be required to be designed by a registered design professional. Section R802.4.4 of the 2018 International Residential Code read as follows:

***R802.4.4 Rafter supports.*** *Where the roof pitch is less than 3:12 (25-percent slope), structural members that support rafters, such as ridges, hips and valleys, shall be designed as beams, and bearing shall be provided for rafters in accordance with section R802.6*



# Building Guide

Colorado Chapter of the International Code Council

## Single Family Residential Basement Finish

### How to Use this Guide

Provide three sets of plans, drawn to scale and complete the following (*hint: use graph paper with 1/4" squares. Example: 1/4" = 1'*): Check with your jurisdiction for additional requirements.

### 1. Review this Building Guide

### 2. Provide 3 Floor Plans

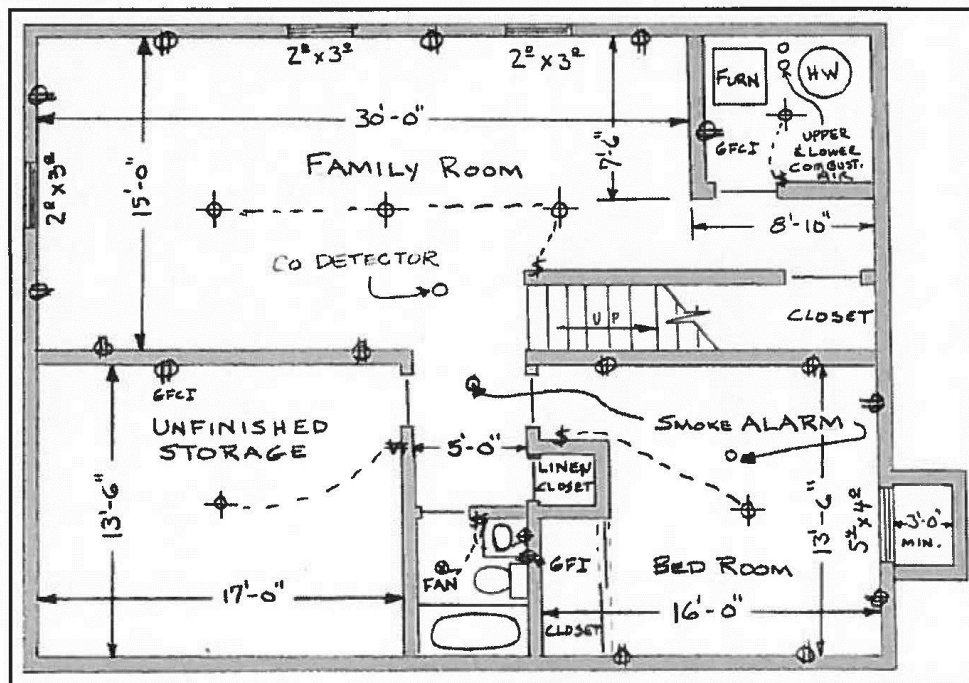
### 3. Fill out a Building Permit Application

The majority of permit applications are processed with little delay. The submitted documents will help determine if the project is in compliance with building safety codes, zoning ordinances and other applicable laws.

**Smoke alarms and carbon monoxide alarms are required.**

The Colorado Chapter of the International Code Council is a professional organization seeking to promote the public health, safety and welfare to building construction. We appreciate your feedback and suggestions. To obtain a master copy of this building guide, please write to the Colorado Chapter of the International Code Council, P.O. Box 961, Arvada, CO 80001.

<http://www.coloradochaptericc.org>



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[www.louisvilleco.gov](http://www.louisvilleco.gov)

Building Safety Division  
749 Main St.  
Louisville, CO 80027  
303-335-4592 Phone  
303-335-4588 FAX



# Single Family Residential Basement Finish

## Directions

- Submit three complete sets of required information.
- Draw a floor plan with dimensions drawn to scale, showing the layout of the entire basement. Label the use for all of the rooms.
- Show electrical outlets, smoke alarms, carbon monoxide alarms, lighting, fans, plumbing modifications, cleanouts, furnace, and water heater.
- List window sizes and types, identify emergency escape and rescue windows, and egress window wells with ladder and clear dimensions of window well.
- Identify modifications to the existing structure such as posts, beams and floor joists.
- Indicate height of dropped ceiling areas less than 7 feet.
- A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6' 8" above a minimum area 30" by 30" at the showerhead. See Exception 2, P2708.1.
- Show plumbing fixtures and clearances around each.
- Show insulation values

## Basement Finish Requirements

### 1. Ceiling Heights:

If the finished ceiling will be less than 7', please consult your Building Department.

### 2. Emergency Escapes:

All basements and sleeping rooms must have an emergency escape window or exterior door. Emergency escape windows with a sill height below grade must be provided with an emergency escape window well and ladder. (For emergency escape window and window well requirements, see page 3.)

### 3. Smoke Alarms:

Smoke alarms are required in all basements. If the finished basement contains a sleeping room, a smoke alarm must be installed on the ceiling or wall in the sleeping room and in the hallway or area immediately outside of the sleeping room. Smoke alarms added to satisfy the above requirements must be hard-wired with battery backup, and interconnected with existing smoke alarms. Smoke alarms are required to be hardwired and interconnected in new and existing bedrooms, halls and on each level unless removal of interior wall or ceiling finishes would be required. In this case, battery operated devices are acceptable. Listed wireless alarms are acceptable.

### 4. Carbon Monoxide Alarms:

Carbon Monoxide alarms are required on each floor with bedrooms. They are recommended to be located no farther than 15 ft. from any bedroom entrance. Do not install within 15 ft. of a fuel burning appliances. Follow manufacture's recommendations for location testing and replacement.

### 5. Fuel Burning Appliances:

Furnaces and water heaters cannot be located in a bedroom or bathroom unless appliances are installed in a dedicated enclosure in which all combustion air is taken directly from outdoors, and a weather stripped solid door equipped with an approved self closing device is installed. If the furnace and water heater are being enclosed, adequate combustion air must be provided for these appliances to operate properly. For maintenance purposes, a minimum of 30 inches clear working space must be provided in front of furnaces and water heaters. Maintenance or removal of each appliance must be possible without removing the other or disturbing walls, piping, valves, ducts, vents, wiring or junction boxes.

### 6. Floated Walls:

In areas subject to floor heaving, non-bearing walls on basement floor slabs should be built to accommodate not less than 1-1/2 inches of floor movement. A detail of a typical floated wall is included on Page 3 of this hand-out.

### 7. Fireblocking:

Fireblocking must be installed in concealed spaces of wood-furred walls at the ceiling level, at 10-foot intervals along the length of the wall and at all interconnections of concealed vertical and horizontal spaces such as intersection of stud walls and soffits or dropped ceilings. A detail of typical fireblocking is included on the following page of this handout. Fireblocks may be constructed of 1-1/2 inch lumber, 3/4 inch plywood, OSB or particle board, 1/2 inch gypsum board or fiberglass insulation 16 inches minimum in height, securely fastened.

### 8. Insulation:

Check with your Building Department for insulation requirements.

### 9. Space Under Stairs:

If access to the area or space under the basement stairs is provided for storage or other uses, the walls and ceiling of this enclosed space must be protected on the inside with 1/2 inch gypsum board.

### 10. Bathrooms:

Toilets must be provided with a minimum of 21 inches in front of the toilet and 15 inches from the center of the toilet and any sidewall or other obstruction. Showers shall have a minimum inside dimension of 900 square inches, capable of encompassing a 30 inch circle and be finished 72 inches above the floor with non-absorbent materials. Shower door minimum clear opening width is 22 inches. See Exception 2, P2708.1.

A ventilation fan is required in toilet rooms and bathrooms with unopenable windows. The fan must be vented to the exterior of the building and not to terminate within 3 feet of an opening.

### 11. Lighting & Ventilation:

Lighting and ventilation are required for any finished portion of the basement. Contact your Building Department for specific requirements.

**The Building Department staff can help you determine what is necessary to meet minimum safety requirements.**

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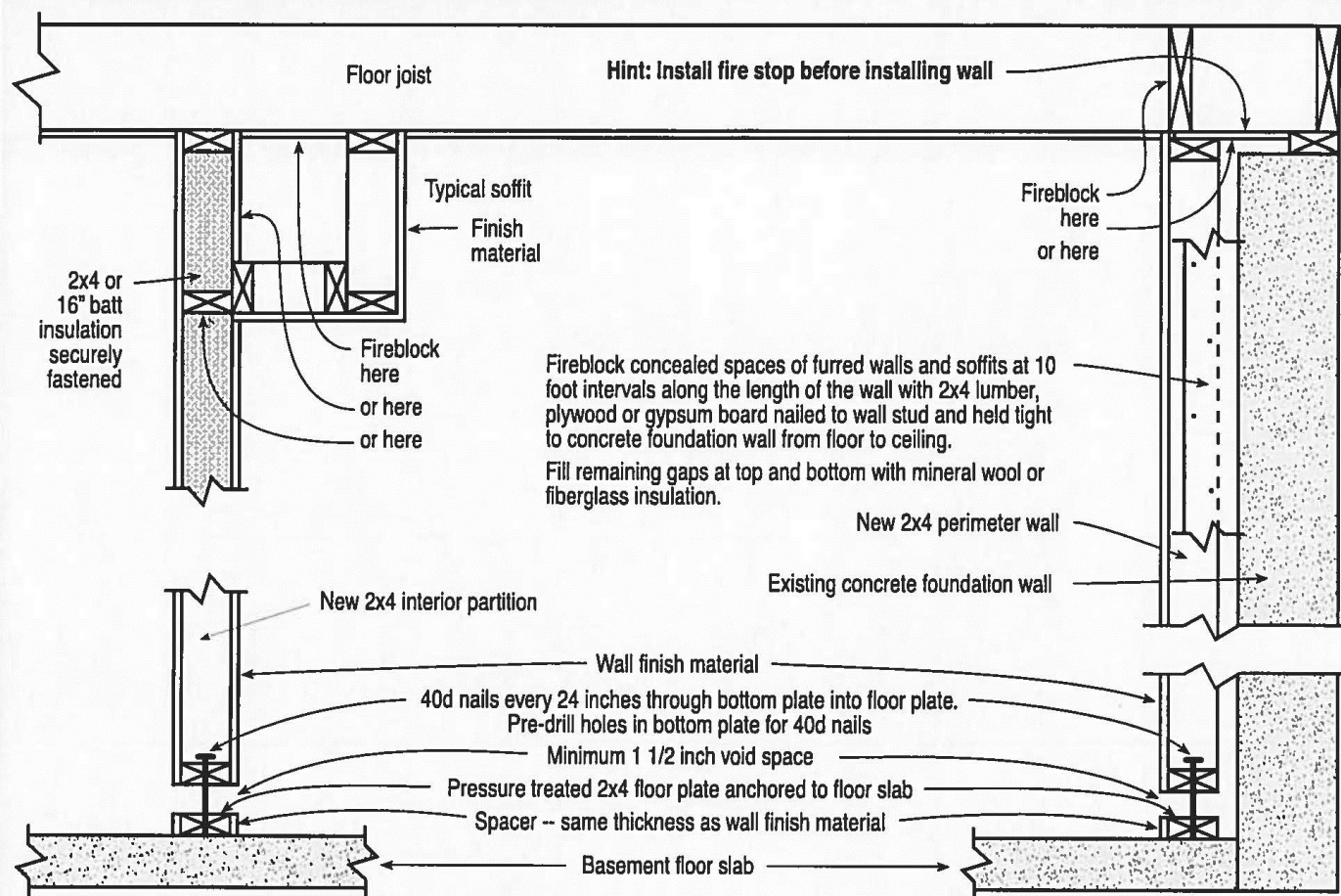
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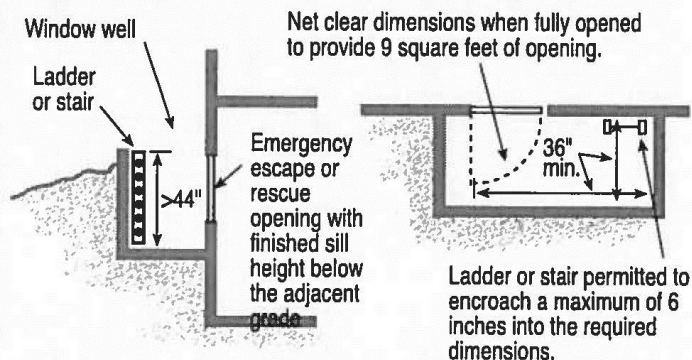
# Single Family Residential Basement Finish

## Basement Finish Details



## Emergency Escape & Rescue Window Well

Emergency Escape And Rescue window wells must provide a minimum area of 9 square feet with a minimum dimension of 36 inches and shall enable the window to open fully. If the depth of the window well exceeds 44 inches, a permanently affixed ladder must be provided. The ladder must not interfere with the operation of the window.

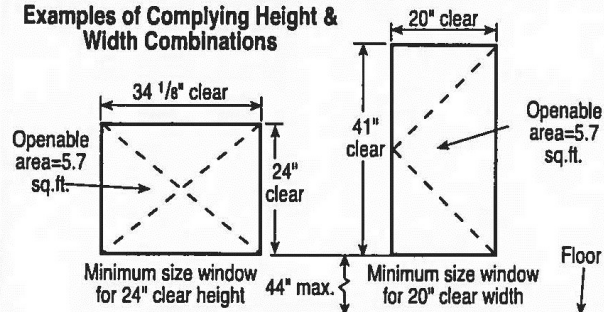


## Emergency Escape & Rescue Window

Emergency Escape And Rescue Windows must meet the following criteria:

- A minimum total openable area of not less than 5.7 square feet
- A minimum clear openable height of not less than 24 inches
- A minimum clear openable width of not less than 20 inches.
- A finished sill height of not more than 44 inches above the floor and the window should be openable from the inside with normal operation and without the use of tools, keys or special knowledge.

### Examples of Complying Height & Width Combinations



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**Basement Finish**

Based upon the: 2012 International Residential Code (IRC), 2012 International Energy Conservation Code (IECC) and 2017 National Electric Code (NEC).

**OWNER'S NAME** \_\_\_\_\_ **PERMIT #** \_\_\_\_\_

**GENERAL CONTRACTOR** \_\_\_\_\_

**PROJECT ADDRESS** \_\_\_\_\_

**IMPORTANT NOTICE**

This list is an integral part of your approved plans. All items contained on this list are minimum code requirements and must be complied with if your construction is to receive inspection approvals. The noted comments are those items which, during the course of our plan review of your project, were found to be incorrect, unclear, or not shown on your plans. Some items are noted even if they are shown correctly on the plans simply to remind you of an important code requirement.

Special note should be taken of the noted items so that corrections can be made during the course of construction. Every effort has been made to note all necessary corrections during our plan review process. However ultimately, it is the responsibility of the permit holder to perform the construction according to minimum code requirements, regardless of whether or not the items are circled on this list. If you have any questions, please contact the building division at 303-335-4584 before proceeding.

This set of approved plans stamped approved, dated and initialed **must** be available to the building inspector on the site when inspections are made. Failure to have these approved plans on the job site may result in:

- 1) No inspection being performed.
- 2) No inspection approval.
- 3) No approval to proceed with the construction.
- 4) Payment of a \$100.00 re-inspection fee at the building division before the inspection is rescheduled (Louisville / Resolution 85 Series 2011(2)).

**SPECIAL NOTE: LICENSING REQUIREMENTS FOR PLUMBING AND ELECTRICAL WORK.** Per Colorado law (CRS 12-58-101 et seq & 12-23-101 et seq, respectively), persons performing plumbing or electrical work for hire must be licensed by the State Plumbing or Electrical board, respectively, and must be working under the supervision of persons licensed by the state to operate a plumbing or electrical business. For plumbing work, this means that the individual must not only be licensed by the state as a plumber, but must also either hold a Master Plumber's license or be working under the direct supervision of a Master Plumber. For electrical work, the person doing the work must not only be licensed, but must also either hold a Master Electrician's license and an Electrical Contractor's license or be working under the direct supervision of an individual licensed as such. The only applicable exception to these laws is that individuals may perform electrical or plumbing work within their own home. (See CRS 12-58-113(2) and 12-23-111(2), respectively, for details).

## Inspection Guidelines

It is the intent of the Building Safety Division to provide prompt service and the greatest possible cooperation with the builder or homeowner within the framework of the building codes. Similar cooperation on the part of the builder or homeowner will improve this process. The following guidelines are offered to promote a better understanding between the builder or homeowner and the Building Safety Division. This understanding will help the builder or homeowner avoid delays and the building department staff to perform their job more effectively. The following guidelines will apply to all projects.

- A. **Job addresses and permit must be posted and visible from the street:** Place the green permit in an area which it will be readily visible from the street.
- B. **Inspection record card must be available for inspector:** The Inspection Record Card and all previous correction lists must be available to the inspector for all re-inspections.
- C. **Approved building plans:** The approved, stamped set of building plans must be on site and available to the inspector for review at the time of inspection.
- D. **Request for inspection:** Inspection requests may be called in twenty four hours a day, to 303-335-4583 and left on the recording. Only those inspection requests with the proper information will be accepted. Inspection requests are taken from the voice mail each work day after 4:00 p.m. for the next business day's inspections. Inspections called in after 4:00 p.m. will be placed on the 2<sup>nd</sup> business day's schedule i.e. inspections called after 4:00p.m on Friday will be scheduled for the following Tuesday. **Inspections should not be requested until the work is complete and ready for inspection.**
- E. **Information required for inspection request:** Only inspection requests called in with the **PERMIT NUMBER**, address of the job, type of inspection, and contact information, will be scheduled. **Only inspections for residential properties will be given an a.m. or p.m. time frame.**

## Required Inspections

1. **Underground plumbing:** This inspection is required only when it is necessary or desirable to pour concrete over or otherwise cover part of the plumbing installation before the entire rough-in is completed. This inspection can be combined with the rough plumbing inspection if all parts of the system are still open and visible to the inspector at that time. A pressure test using either air or water will be required for this inspection.
2. **Rough electrical, framing, plumbing, and mechanical (combination inspection):** This inspection is done as a combination rough inspection and must be called in as one inspection when all rough-in work is completed and ready for inspection.

The electrical rough-in must be complete, including all circuits made up, boxes and plaster rings installed, panel set, neutral and ground wires made up, and all grounding is complete with the installation ready for drywall, but without insulation in place. A new meter enclosure, panel or subpanels should be made up at this time and ready for inspection.

All air or water pressure tests required of the International Residential Code must be ready at time of rough inspection. (City of Louisville Policy)

**The larger window well (if needed) for emergency escape and rescue opening must be started at this time or the inspection will not be approved.**

3. **Insulation:** This inspection is to be requested after all insulation is in place and ready for drywall. The minimum insulation values are R15 continuous / R19 batt for basement walls below grade for a depth of 10 feet or to the top of the footing. (Table N1102.1)
4. **Wallboard:** This inspection is to be requested after all wallboard is installed and properly fastened, but prior to taping and spotting of fasteners so that the adequacy of fastening and proper type and thickness of materials can be verified
5. **Above ceiling:** This inspection is required where suspended grid type ceilings are to be installed and should be requested after all work above the grid ceiling is completed, all light fixtures are set, all grills, registers, and connecting ductwork are completed, but before any tile has been installed.
6. **Final building, electrical, plumbing, and mechanical:** This inspection should be requested when all work is completed and the building or space is ready for occupancy. Final building, electrical, plumbing, and mechanical will be done as a combination inspection and must be called in as one inspection.

**Please note that the required larger window well (if needed) needs to be completed at the time of final.**

Basement Finish  
Important Requirements

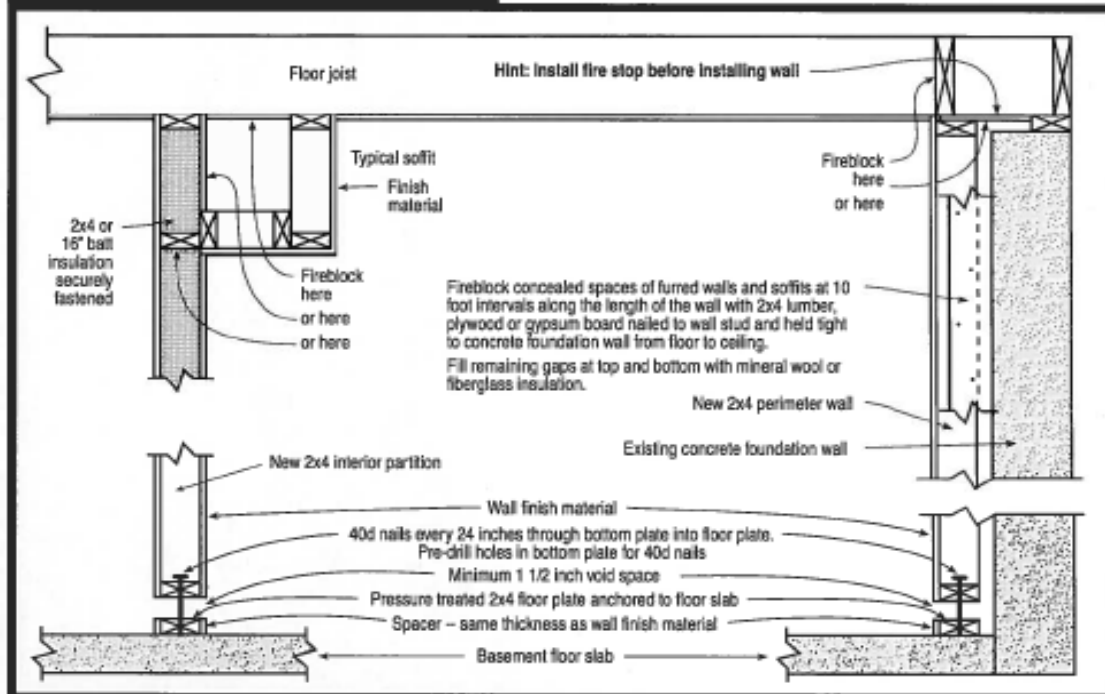
<b><u>ITEM #</u></b>	<b><u>PROVISION</u></b>
B21)	<b><u>Rough frame inspection:</u></b> is to be made after all framing, fire blocking, mechanical, electrical and plumbing rough-ins are complete.
B22)	<b><u>Draftstopping &amp; Fire Blocking:</u></b> shall be installed in combustible construction as per R302.12 and R302.11 respectively. See Basement Finish Details sheet for specifics.
B23)	<b><u>Expansion Soils:</u></b> Due to potential floor heaving, non bearing walls on basement floor slabs must be built with a minimum of 1.5" float. The required float may vary depending on soils report in your area, if available. Drywall must be held a minimum of 1.5" above the floor or the distance of the float required by soils report. (R403.1.8)
B24)	<b><u>Ceramic Tile:</u></b> Used in bathtub and shower enclosures are required to have fiber-cement, fiber-mat reinforced cement, glass mat gypsum backers or fiber-reinforced gypsum backers applied to the wall studs to a point not less than 70" above the drain inlet. (R702.4.2) Water resistant gypsum board shall not be used in the following locations: (R702.3.8)  <ol style="list-style-type: none"><li>1. Over vapor barriers.</li><li>2. In areas subject to continuous high humidity.</li><li>3. On ceilings where framing exceeds 12" on center.</li></ol>
B25)	<b><u>Insulation Values</u></b> (prescriptive) All ceilings, walls and floors shall be insulated with an approved insulating material that has a minimum "R" value as follows: (Table N1101.2.1)  <ol style="list-style-type: none"><li>1. Exterior walls: (above grade) R20</li><li>2. Basement walls: (below grade) R15 continuous / R19 batts</li></ol>
B26)	<b><u>Glazing Values</u></b> (prescriptive) All glazing shall have a maximum U value as follows: (Table N1101.2.1)  <ol style="list-style-type: none"><li>1. Windows: 0.32 Doors:</li></ol>
L01)	<b><u>Natural light &amp; Ventilation:</u></b> All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated. (Section R303)
L02)	<b><u>Emergency Escape and Rescue Openings:</u></b> Basements, habitable attics and <u>every sleeping room</u> shall have at least one operable emergency escape and rescue opening. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches above the floor. All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet. The minimum net clear opening height shall be 24 inches. The minimum net clear opening width shall be 20 inches. Window well shall be 9 square feet, with a minimum horizontal projection and width of 36 inches. Window wells exceeding 44 inches in height shall be equipped with a permanently affixed ladder. Grade floor openings shall have a minimum net clear opening of 5 square feet. (R310)



## BASEMENT FINISH DETAIL

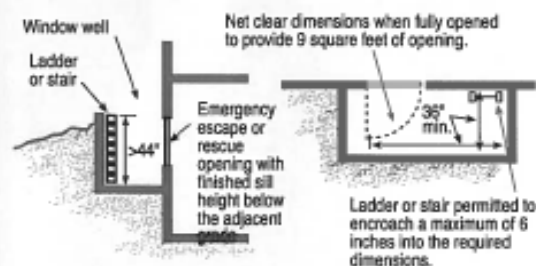
### Single Family Residential Basement Finish

#### Basement Finish Details



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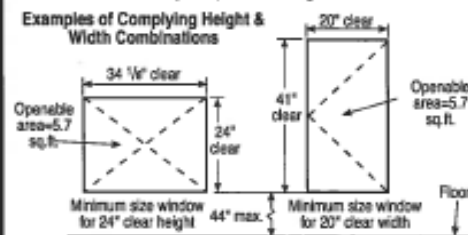


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**THE NEW WINDOW WELL IS REQUIRED TO BE STARTED AT TIME OF ROUGH INSPECTIONS**

L03)

**Ceiling Height:** Habitable space, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet. Portions of basements that do not contain habitable space, hallways, bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches. Beams, girders, ducts or other obstructions may project to within 6 feet, 4 inches of the finished floor. (R305)

L04)

**Smoke Alarms:** Smoke alarms shall be installed in the following locations:

1. In each sleeping room (installed as per manufactures requirements)
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attic. When more than one smoke alarm is required to be installed within an individual dwelling unit, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

L05)           **Carbon Monoxide Alarms:** An approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages. (R315)

L06)           **Stair Handrail:** Shall to be placed 34" minimum to 38" maximum above the nosing of the treads. Handrails are to be grippable and cross-sectional dimensions to be 1-1/4" to 2". (R311.7)

L07            **Guardrails:** Guardrails shall be located along open-sided walking surfaces, including stairs, ramps and landings, that are located more than 30 inches measured vertically to the floor or grade. Guardrail height at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically above the adjacent walking surface. (R312)

L08)           **Stairway Headroom:** Minimum height requirement is 6 feet 8inches. (R311.7.2)

L12)           **Under-stair Protection:** Enclosed accessible space under stairs shall have walls, under-stair surface and any soffits protected on the enclosed side with a minimum 1/2-inch gypsum board and fire taped (R302.7)

L13)           **Heating Facilities:** Every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68°F at a point 3 feet above the floor and 2 feet from exterior walls in all habitable rooms at the design temperature. The installation of one or more portable space heaters shall not be used to achieve compliance with this section. (R303.10)

L14)           **Glazing Hazardous Locations:** Safety glazing is required when measured less than 60 inches measured vertically above any standing or walking surface at the following: (R308.4)

- a. Within 24 inches of either edge of a door.
- b. In stairway enclosures.
- c. In bathtub & shower enclosures.

E901)           **Required Outlets:** In dwelling units, at least one wall switch-controlled lighting fixture or outlet shall be installed in every habitable room, bathroom, hallways and attics or under floor spaces used for storage or containing equipment requiring servicing. A wall switch is required at each floor where a difference between floor levels is six steps or more. (NEC 210-52)(A)(2-3)

E902)           **Bathrooms.** In dwelling units, at least one wall receptacle outlet shall be installed in bathrooms within 36 inches of the outside edge of each basin. The receptacle



outlet shall be located on a wall that is adjacent to the basin location and equipped with ground-fault circuit-interrupter protection for personnel. (NEC 210-8)(B)

- E903) **Required Circuit.** At least one 20-ampere branch circuit shall be provided to supply the bathroom receptacle outlet(s). When a 20-ampere circuit supplies a single bathroom, other equipment such as lighting or exhaust fans are permitted to be supplied provided the total rating of the equipment fastened in place, does not exceed 10 amperes. (NEC 210-11)(3) and (NEC 210-23)(A)
- E904) **Wet bar sink.** Where the receptacles are installed to serve the countertop surfaces and are located within 6 feet of the outside edge of the wet bar sink they shall have ground-fault circuit-interrupter protection for personnel. (NEC 210-8)(A)(7)
- E905) **Cable Installation.** In both exposed and concealed locations, where a cable or raceway-type wiring method is installed through bored holes in joists, rafters, or wood members, holes shall be bored so that the edge of the hole is not less than 1¼ inches from the nearest edge of the wood member. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by screws or nails by a steel plate or bushing, at least 1/16 inches thick, and of appropriate length and width installed to cover the area of the wiring. (NEC 300-4)(A)(1)
- E906) **Cable Installation.** In both exposed and concealed locations where nonmetallic-sheathed cables pass through either factory or field punched, cut, or drilled slots or holes in metal studs or members, the cable shall be protected by bushings or grommets covering all metal edges and securely fastened in the opening prior to installation of the cable. The edge of a hole shall be not less than 1¼ inches from the nearest edge of the metal member. (NEC 300-4) (b) (1)
- E907) **Cable Installation.** The outer sheath on Nonmetallic-sheathed cable shall extend into the box no less than 1/4 in. and shall be secured to the box. Only one exception for not securing the cable to the box is for single gang boxes no larger than a nominal size 2¼ in. x 4 in. and where the cable is fastened within 8 in. of the box measured along the sheath. (NEC 370-17)
- E908) **Cable Supports.** Nonmetallic-sheathed cable shall be secured by an approved UL Listed electrical strap, staples, cable ties, or similar fittings designed and installed so as not to damage the cable. Cable shall be secured in place at intervals not exceeding 54 inches and within 12 inches from every cabinet, box, or fitting. Flat cables shall not be stapled on edge. (NEC 336-18)
- E909) **Cable Wire Length.** At least 6 inches of free conductor, (without sheathing) measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction, and switch point for splices or the connection of fixtures or devices. (NEC 300-14)
- E910) **Receptacles.** Receptacles shall be installed so that no point along the floor line in any wall space is more than 6 feet measured horizontally, from an outlet in that space. A wall space shall include any space 2 feet or more in width (including space measured around corners) and unbroken along the floor line by doorways, fireplaces, and similar openings. (NEC 210-52)
- E911) **Boxes.** Boxes are marked by the manufacturer with their cubic inch capacity to provide free space for all enclosed conductors, devices (receptacles & switches), ground- wires, fixture studs and internal cable clamps. In no case shall the volume of the box be less than fill calculations in (NEC 370-16) (a) and (b).  
NOTE: A standard single gang 3-½ in. deep plastic nail on box can usually have 3 number 14/2 with ground cables and one device.

NOTE: A standard two-gang 3-½ in. deep plastic nail on box can usually have 4 number 12/2 with ground cables and two devices.

- E912) **Installing Boxes.** In walls or ceilings of concrete, tile, (plaster, drywall) or other noncombustible material, boxes shall be installed so that the front edge of the box will not be set back of the finished surface more than ¼ inch. In walls and ceilings constructed of wood (paneling, pegboard) or other combustible material, boxes shall be flush with the finished surface or project there from. (NEC 370-20) **All BOXES MUST BE ACCESSIBLE** (NEC 370-29)
- E913) **Metal Boxes.** A connection shall be made between the one or more equipment grounding conductors and a metal box by means of a green 10/32 grounding screw that shall be used for no other purpose or a listed grounding device. (NEC 250-148) (a)
- E914) **Unused Openings.** Cable or raceway openings in boxes and conduit bodies shall be effectively closed to afford protection substantially equivalent to that of the wall of the box or conduit body. Metal plugs or plates used with nonmetallic boxes or conduit bodies shall be recessed at least ¼ inch from the outer surface of the box. (NEC 370-18)
- E915) **Clothes Closets.** Incandescent light fixtures installed in clothes closets must be enclosed and located not less than 12 inches from face of shelf. Fluorescent fixtures must be enclosed and located not less than 6 inches from face of shelf. Pendant fixtures shall not be permitted. Where there are no shelves installed, add 12 inches from the wall to the minimum requirements from above for incandescent and can lights for their required locations. (NEC 410-2)
- E916) **Smoke Alarms – General Information Only. See Builders Assistance Provisions for locations of smoke alarms. Items # L04 and reference R314 above)**  
It is common practice of interconnecting the required power (with battery back-up) for the new basement smoke alarms (such as: bedrooms, corridor or area giving access to each bedroom area) to the existing basement detector and house detectors, by using one NM-B cable with 3-insulated conductors and one bare ground. If two cables are used (2-insulated conductors and one bare ground in each cable) these cables must be run together (stacked flat and stapled together) between the detectors. Another requirement in the above provisions is to install smoke detectors in existing bedrooms. When installing smoke alarms in existing bedrooms, they may be powered solely by battery, but must be interconnected by wire or wireless if more than one smoke detector is added.
- E917) **Carbon Monoxide Alarms:** For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages.
- E918) **Concrete Embedded Branch Circuits:** Below grade concrete embedded branch circuits are required to be wet rated (NEC 300.5)
- E919) **Unfinished Areas:** Unfinished areas require GFCI outlets (IRC - E3801.9)
- M01) **Clothes Dryer Exhaust:** Exhaust ducts shall have a smooth interior finish and shall be constructed of metal a minimum 0.016-inch thick. The exhaust duct size shall be 4 inches nominal in diameter. Exhaust ducts shall be supported at 4 foot intervals and secured in place. The maximum length of the exhaust duct shall be 25 feet. (M1502)



DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH	
DRYER EXHAUST DUCT FITTING TYPE	EQUIVALENT LENGTH
4 inch radius mitered 45 degree elbow	2 feet 6 inches
4 inch radius mitered 90 degree elbow	5 feet
6 inch radius smooth 45 degree elbow	1 foot
6 inch radius smooth 90 degree elbow	1 foot 9 inches
8 inch radius smooth 45 degree elbow	1 foot
8 inch radius smooth 90 degree elbow	1 foot 7 inches
10 inch radius smooth 45 degree elbow	9 inches
10 inch radius smooth 90 degree elbow	1 foot 6 inches

- M02) **Bathroom Fans:** Where toilet rooms and bathrooms are mechanically ventilated, the ventilation equipment shall be installed in accordance with this section. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another dwelling unit and shall be exhausted directly to the outdoors. The exhaust rate shall be a minimum of 50 cfm intermittent or 20 cfm continuous (M1505)
- M03) **Gas Vent Clearance:** Provide minimum 6" clearance between Type "B" gas vents and combustible material. For the purposes of this section, wallboard and insulation is considered combustible.
- M04) **Water Heater/Furnace Locations:** Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces. (G2406.2)
- M05) **Appliance Access:** Appliances shall be accessible for inspection, service, repair and replacement without removing permanent construction, other appliances, or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced. A level working space at least 30 inches deep and 30 inches wide shall be provided in front of the control side to service an appliance. (M1305.1)
- M06) **Appliances in Rooms:** Appliances installed in a compartment, alcove, basement or similar space shall be accessed by an opening or door and an unobstructed passageway measuring not less than 24 inches wide and large enough to allow removal of the largest appliance in the space, provided there is a level service space of not less than 30 inches deep and the height of the appliance, but not less than 30 inches, at the front or service side of the appliance with the door open. (M1305)
- M12) **Combustion Air:** Outdoor combustion air shall be provided through opening(s) to the outdoors. The minimum dimension of air openings shall be not less than 3 inches. (G2407.6)
- M13) **Return Air :** Provide in an unrestricted common area where proper air flow will not be impeded by doors, etc. An 8" round duct is usually sufficient.
- P01) **Shower Control Valves:** Individual shower and tub/shower combination valves shall be equipped with control valves of the pressure-balance, thermostatic-mixing or combination pressure balance/thermostatic-mixing valve types with a high limit stop. The high limit stop shall be set to limit water temperature to a maximum of 120°F. In-line thermostatic valves shall not be used for compliance with this section. (P2708)

- P02) **Access To Connections:** Slip joints shall be made with an approved elastomeric gasket and shall be installed only on the trap outlet, trap inlet and within the trap seal. Fixtures with concealed slip-joint connections shall be provided with an access panel or utility space at least 12 inches in its smallest dimension or other approved arrangement so as to provide access to the slip connections for inspection and repair. (P2704)
- P03) **Water Meter Access:** When enclosing a water meter with framing and drywall, provide an access panel with a minimum dimension of 24 inches wide X the height needed to provide access to the meter, shutoffs and pressure reducing device. (City of Louisville Utility Policy) Allow 18" minimum bucket access under meter.
- P04) **Water Heater Access:** Appliances shall be accessible for inspection, service, repair and replacement without removing permanent construction, other appliances, or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced. A level working space at least 30 inches deep and 30 inches wide shall be provided in front of the control side to service an appliance. (Section M2005.2.1)
- P05) **Expansion Tanks:** Hot water boilers (hot water heaters) shall be provided with expansion tanks. Non-pressurized expansion tanks shall be securely fastened to the structure or boiler and supported to carry twice the weight of the tank filled with water. Provisions shall be made for draining non-pressurized tanks without emptying the system. (Section M2003)
- P06) **Water Hammer Arrestor:** The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. Water-hammer arrestors shall be installed in accordance with the manufacturer's installation instructions. Water hammer arrestors shall conform to ASSE 1010. These shall be installed on all "quick closing valves" such as washer machines, dishwashers, ice makers and such. (P2903.5)
- P07) **Shower Pan Receptors:** Shower receptors shall have a finished curb threshold not less than 1 inch below the sides and back of the receptor. The curb shall be not less than 2 inches and not more than 9 inches deep when measured from the top of the curb to the top of the drain. The finished floor shall slope uniformly toward the drain not less than 1/4 unit vertical in 12 units horizontal (2-percent slope) nor more than 1/2 inch, and floor drains shall be flanged to provide a water-tight joint in the floor. The lining material shall extend not less than 3 inches beyond or around the rough jambs and not less than 3 inches above finished thresholds. Sheet-applied load bearing, bonded waterproof membranes shall be applied in accordance with the manufacturer's installation instructions. (P2709.1&2)

P08) **Toilet, Bath and Shower Spaces:**

